State Air Pollution Control Board
&
Department of Environmental Quality

Presentation

By

City of Alexandria

January 25, 2008

Proposed Two-Stack Permit Is Flawed and Does not Address SAPCB Mandate

- SAPCB's mandate to VDEQ has been to consider one of the following permitting options for the proposed stack merger:
  - A NSR pre-construction permit through establishing appropriate emission baselines and resolving all past and present NSR issues raised by the City of Alexandria
  - Synthetic minor permit by establishing NAAQS-compliant emission limits for all pollutants

THIS PERMIT IS NEITHER OF THE ABOVE

Board Directed VDEQ to Resolve All NSR Issues

- All NSR issues must be promptly resolved:
  - Past
    - Past NSR violations for LNB, SOFA and trona installations
    - Increase in the maximum heat input rates as compared to the rated capacities
  - Proposed
    - Use of an alternate sorbent other than trona
    - Either a pre-construction NSR permit or a synthetic minor permit must be issued for the stack merger project
    - Ash handling de-bottlenecking project also requires a NSR permit analysis

SAPCB Previously Made the Determination That Stack Merger Would Increase Emissions

- Therefore requiring a NSR permit to construct or a synthetic minor permit
  - Increased heat input
  - Inadequate engineering analysis
  - Increased fan capacity and availability
  - De-bottlenecking
  - Single-boiler operation

$PM_{2.5}$ Emissions and Impacts Must Be Addressed

- Since the downwash issue was identified in 2004, City has been requesting that $PM_{2.5}$ modeling and analysis be carried out for this facility
- City sent the SAPCB and VDEQ a letter dated January 14, 2008 demonstrating that $PM_{2.5}$ modeling must be applied to establish proper emission limits
- Several states (NJ, NY, CT) have proceeded to establish $PM_{2.5}$ modeling methodology for individual sources and are using it to set NAAQS-compliant emission limits
- Modeling of direct $PM_{2.5}$ emissions can be accomplished via standard modeling using AERMOD, as these other states are doing

$PM_{2.5}$ Emissions and Impacts Must Be Addressed

- Federal guidance documents demonstrate the acceptability of using AERMOD to estimate a facility's local-scale impacts of primary $PM_{2.5}$
- Alexandria's analysis shows that stringent emission limits and pollution controls are required to minimize $PM_{2.5}$ emissions to a level that is NAAQS protective
- As part of the state SIP due in April 2008, VDEQ must address any unmonitored area or "hot spots" within the $PM_{2.5}$ nonattainment area

$PM_{2.5}$ Emissions and Impacts Must Be Addressed

- The federal Clean Air Fine Particle Implementation Rule which became final on April 25, 2007 states that

  "Upon promulgation of this final rule, the EPA will no longer accept the use of PM_{10} emissions information as a surrogate for $PM_{2.5}$ emissions information given that both pollutants are regulated by a National Ambient Air Quality Standard and are therefore considered regulated air pollutants"

- Any EPA guidance contrary to federal regulations is invalid

$PM_{2.5}$ Emissions and Impacts Must Be Addressed

- Virginia DEQ's approach to date of using PM_{10} as a surrogate for $PM_{2.5}$ is unlawful. Given that Northern Virginia is a nonattainment area for $PM_{2.5}$, it is also irresponsible

- Even if one were to apply the PM_{10} surrogate approach, for nonattainment area, PM_{10} impacts have to be compared to PM_{10} SILs

$PM_{2.5}$ Emissions and Impacts Must Be Addressed

- Virginia's 9 VAC 5-80-1180.A.3 prohibits the issuance of a permit unless the facility has been

  "*designed, built and equipped to operate without preventing or interfering with the attainment or maintenance of any ambient air quality standard (AAQS) and without causing or exacerbating a violation of any applicable ambient air quality standard".*

- Any guidance from VDEQ or EPA contrary to this regulation is invalid and unlawful

$PM_{2.5}$ Emissions and Impacts Must Be Addressed

DEQ's Quote in its answer to Mirant on CAIR rule:

- "The over-arching goal of any air quality program is to reduce pollution to levels that do not impact public health. To argue that because EPA identifies a particular program as a tool to address regional transport, it therefore should not or cannot be used to also address nonattainment issues is a parochial view; a view that Virginia cannot afford as we address the very serious air quality issues facing the more than two million people in Northern Virginia. Protection of public health is the prime objective of all air quality programs, regardless of how they may be marketed."

- The Board and VDEQ have the responsibility to protect its citizens from the harmful and long-term impact of $PM_{2.5}$ emissions
  - The City demands a NAAQS-compliant $PM_{2.5}$ emission limit in any permit issued by VDEQ
  - Alexandria is prepared to apply all available options to resolve this most important health-related issue

Baghouses are Required to Adequately Control $PM_{2.5}$ Emissions

- City's analysis shows that the use of any dry sorbent for acid gas emission control is basically a trade-off between acid gas emissions and particulate emissions **unless it is accompanied with an upgrade of the existing particulate control system, e**.g., the use of baghouses
  - NAAQS Compliance
  - No increase in PM
  - State-of-the-art technology for $PM_{2.5}$ control on a continuous basis
  - Provide multi-pollutant control, e.g., mercury, acid gases, enhanced removal of SO_2 with trona

Trona Increases PM Emissions

- Mirant opacity data shows increase in opacity with trona injection
- Frequency of episodes of >20% opacity also increases with trona

Boiler	Average Opacity		% Increase in Opacity, %
	Pre-Trona (Jun-Aug 2005)	Post-Trona (Jun-Aug 2006)	
1	2.86	6.03	110.8
2	4.16	6.76	62.5
3	3.62	3.74	3.3
4	2.61	3.10	18.7
5	2.55	4.10	60.8

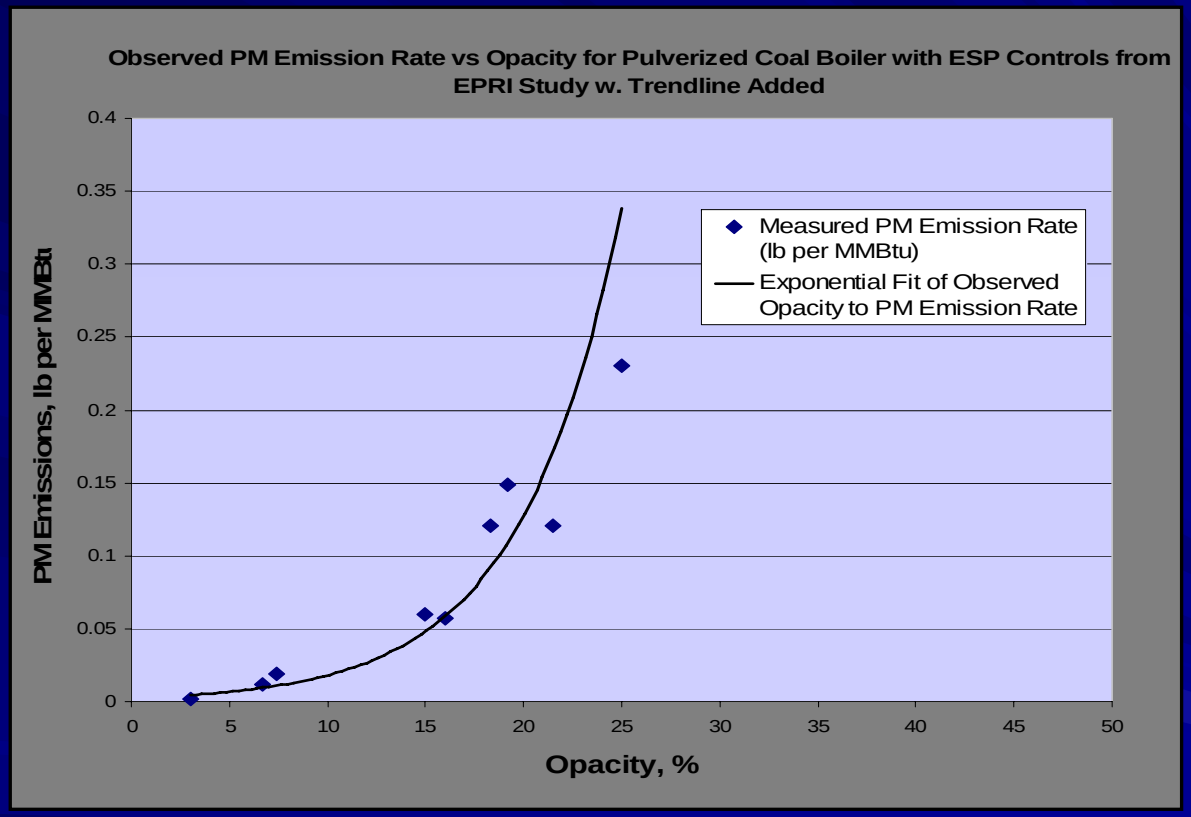
Boiler #3 showed the least negative impacts of trona on opacity. However, it was the only boiler used for comparing scenarios with and without trona in 2006 stack testing

Stack Testing Results Are Questionable

Boiler #3 Stack Testing Results in December 2006 on Filterable PM_{10}

PARAMETER	TRONA OFF		TRONA ON	
	Average	Test Results	Average	Test Results
Hot ESP Removal Efficiency (designed for 99%)	99.01	99.76, 99.55, 97.72	98.99	98.56, 98.93, 99.47
Cold ESP Removal Efficiency (designed for 96%)	71.24	**49.83**, 73.34, 90.56	88.83	93.21, 90.34, 82.94
Total PM_{10} Removal Efficiency	99.85	99.88, 99.88, 99.78	99.90	99.90, 99.90, 99.91

Trona Increases PM Emissions



Trona Increases Fugitive Emissions

- Alexandria's analysis shows significant increase in fugitive emissions since the use of trona which effectively increases the amount of fly ash by >100%
- The permit should include requirement for an enclosed fly ash handling operation and transportation to minimize fugitive emissions impact to local population
  - *Trona contains up to 2% silica, a known carcinogen*
- Mirant cannot take credit for the fugitive control project that was implemented under the previous Consent Order

Increased CO Emissions with Trona Use Trigger NSR

Boiler	CO Emissions (ppm) During Dec 2006 Stack Tests		% Increase in CO Emissions
	Trona OFF	Trona ON	
3	Run 2 359	Run 1 1,019	
3	Run 3 481	Run 4 429	
3	Run 6 258	Run 5 485	
Average	**366**	**644**	**76%**

The average rate of 644 ppm would equal a CO emissions rate of ~1,750 tpy for boiler #3 at 60% boiler capacity utilization, compared to Mirant's annual emissions data of ~250 tpy plant-wide that have been submitted to VDEQ for the past several years

Emission Limits are Arbitrary, Excessively High, and Allow Emission Increases

- The proposed two-stack SOP contains no emission limits for $PM_{2.5}$ or mercury. This is a violation of Virginia regulations and a breach of public trust
- The proposed coal sulfur content limit on per shipment basis is 1.2% compared to 0.9% in the present permit, i.e., a 33% increase – a back sliding permit
- The short term NOx limit of 0.30 lb/MMBtu does not reflect the performance of the LNB/SOFA pollution controls, i.e., 0.22 lb/MMBtu

Proposed Limits are Arbitrary, Excessively High, and Allow Emission Increases

- The proposed short term (lb/hr) SO_2 emission limits are greater than the limits in the June 1, 2007 SOP and those in the draft five-stack SOP
  - These higher SO_2 limits lead to higher PM and mercury emissions on an annual basis
- The proposed emission limits of 0.045 lb/MMBtu for PM and 0.03 lb/MMBtu for PM_{10} represent an increase in PM emissions and about twice as high as it can achieve with its ESPs

Proposed Limits are Arbitrary, Excessively High, and Allow Emission Increases

- The annual PM and PM_{10} limits of 562 and 377 tons/yr, respectively, are about three times as high as the plant emitted in the past 24 months – the appropriate regulatory baseline
- The proposed SOP allows Mirant to increase its annual CO limit based on future data it will collect via CO continuous emissions monitors (CEMS)
  - This is a circumvention of NSR regulations
- The opacity limit of 20% is based on antiquated standards and is not protective of public health. Instead, an opacity limit of 10% or less must be required
- The CAIR NOx limits must be stipulated in the SOP

Pollution Control Measures Must Be Operated to minimize Emissions at All Times

- Virginia regulation 9VAC 5-40-20 E states that

  "*[a]t all times, including periods of startup, shutdown, soot blowing and malfunction, owners shall, to the extent practicable, maintain and operate any affected facility including associated air pollution control equipment in a manner consistent with air pollution control practices for minimizing emissions.*"

- Mirant has proven to be capable of controlling SO_2 emissions to below 0.3 lb/MMBtu on a sustainable basis. The SOP should not permit SO_2 emissions >0.3 lb/MMBtu for any operating scenario

PM & CO CEMS Should Be an Immediate Requirement for this Permit

Partial List of PM CEMS (PS-11 certified) Installed in the US and Used for Monitoring and/or Compliance Purposes

Source	PM CEMS Installation Date	PM CEMS Technology
Tampa Electric – Big Bend Unit 4	Feb 2002	Beta Attenuation
Dominion Generation – Mt. Storm Units 1 & 2	Jul 2004	Beta Attenuation
We Energies - Oak Creek Units 5 & 6	Jan 2005	Beta Attenuation
We Energies - Pleasant Prairie Units 1 & 2	Sep 2006	Beta Attenuation
Western Kentucky Energy - Henderson Unit 2	Aug 2005	Beta Attenuation
Western Kentucky Energy - Henderson Unit 1	Feb 2007	Beta Attenuation
Kentucky Utilities Company - Ghent Station		Light Scatter
Kentucky Utilities Company - Mill Creek Station		Light Scatter
Minnkota Power Coop – M.R. Young Unit 2	Jul 2007	Beta Attenuation
DOE Oak Ridge TSCA Incinerator	Dec 2004	Beta Attenuation
Rayonier Pulp Mill - Recovery Boiler	Apr 2003	Beta Attenuation
Kennecott Utah Copper – Primary Smelter	Dec 2005	Beta Attenuation
Sunoco Refinery – FCCU/CO Boiler Stack	Apr 2007	Beta Attenuation

Use of Alternate Sorbent Must not Be Pre-authorized

- Testing of alternate sorbent must require a complete protocol
- $PM_{10}/PM_{2.5}$ stack test must be required
  - *With and without sorbent*
  - *Upstream and downstream of ESPs*
  - *Similar to Dec 2006 stack test required by VDEQ for trona*
- Testing must be done on all boilers
- Test results must be analyzed before allowing a new sorbent in the SOP

Use of Alternate Sorbent Must not Be Pre-authorized

- Any sorbent change should require a NSR permit analysis
- Several published data on sodium bicarbonate shows that approximately 50% of the sorbent as injected is made up of particles less than 12 microns in size
  - Compared to ~20-25% found in trona as injected at the Mirant plant
- Thus, even at lower injection rates, the use of sodium bicarbonate could potentially result in considerable increase in PM_{10} and $PM_{2.5}$ emissions from the stacks

Use of Alternate Sorbent Must not Be Pre-authorized

- Furthermore, sodium bicarbonate can consistently achieve <0.2 lb/MMBtu SO_2 emissions (~85% removal efficiency), based on several published data
  - This will allow PRGS to operate at >38,130,000 MMBtu annually, or about 2.7 times the current heat input level
  - Consequently, fly ash loading to the ESPs will also increase by 2.7 times
- The short-term SO_2 limit should be adjusted according to the actual performance of the sorbent

Proposed Limits Exceed 24-Month Baseline (10/05 – 09/07)

Pollutant	Baseline Emissions (tons/yr)	Proposed SOP Limits (tons/yr)	Proposed Increase (tons/yr)
SO_2	3,813	3,813	0
NOx	1,904	3,700	1,796
PM_{10}	137	377	240
$PM_{2.5}$	117*	--	Unlimited

* This baseline emission does not meet $PM_{2.5}$ NAAQS

Conclusions

- The City of Alexandria requests that the SAPCB reject this proposed two-stack permit at this time because of the following reasons
  - Appropriate emission baseline has not been established
  - NSR issues remain unresolved
  - $PM_{2.5}$ modeling to establish NAAQS-compliant limit is still missing

Conclusions

- Instead, SAPCB should proceed with the issuance of a five-stack permit for this facility, taking into account the City's comments on the five-stack permit including
  - $PM_{2.5}$ emissions from PRGS be modeled and NAAQS-compliant emission limits be established in the permit
  - PM CEMS should be an immediate requirement
  - The use of alternate sorbent should not be pre-authorized
  - Baghouses must be required on all five boilers to protect $PM_{2.5}$ NAAQS and public health

Conclusions

- The limits in the five-stack SOP must not exceed the following:

• SO_2	< 0.30 lb/MMBtu	(trona optimization)
• NOx	< 0.22 lb/MMBtu	(LNB/SOFA optimization)
• PM	< 0.03 lb/MMBtu	(ESP performance)
• PM_{10}	< 0.02 lb/MMBtu	(ESP performance)
• $PM_{2.5}$	< 0.003 - 0.011 lb/MMBtu	(NAAQS compliance)
• CO	< 0.20 lb/MMBtu	(BACT)
• Hg	< 37 lb/yr	(actual baseline emissions)
• Coal sulfur	< 0.9 wt%	(current limit for PRGS)

VDEQ Has Correctly Applied the NSR Regulations in Other Cases

- Virginia Paving emissions are about one hundredth of Mirant's
- Virginia Paving in Alexandria applied for a permit to install a Low-NOx burner on January 4, 2007
- VDEQ's reply on January 19, 2007:
  - "Chapter 50 of the Virginia Regulations for the Control and Abatement of Air Pollution (9 VAC 5-50-260) requires that Best Available Control Technology (BACT) be installed to control emission increases of pollutants from all applicable new and modified stationary sources."
  - "You are reminded that modification of a source subject to the permitting requirements in Chapter 80 of the Virginia Regulations for the Control and Abatement of Air Pollution, without the appropriate new source review permit, can result in enforcement action"

VDEQ Has Correctly Applied the NSR Regulations in Other Cases

- VDEQ subsequently sent Virginia Paving a Notice of Violation on January 16, 2008 for its installing the Low-NOx burner without a permit, citing:

> "In accordance with 9 VAC 5-80-1120(A),"
>
> > "No owner or other person shall begin actual construction, reconstruction or modification of any stationary source without first obtaining from the Board a permit to construct and operate or to modify and operate the source"

Thank You

Questions?